



UNITED STATES DEPARTMENT OF COMMERCE
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MPA

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/254,119 04/16/99 TATSUMI

K 52433/545

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NEW YORK NY 10004

MM92/0328

EXAMINER

CHAMBLISS, A

ART UNIT

PAPER NUMBER

2814

DATE MAILED:

03/28/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.

09/254,119

Applicant(s)

TATSUMI ET AL.

Examiner

Alonzo Chambliss

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 January 2001.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892)
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 18) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other: _____

DETAILED ACTION

1. Claims 7-15 have been canceled.

Response to Arguments

2. Applicant's arguments with respect to claims 1-6 have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102((e), f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-3, **insofar as some of them can be understood**, are rejected under 35 U.S.C. 103(a) as being unpatentable over Atsuhiko (JP 6-333930) in view of Fallon et al. (U.S. 5,542,601).

With respect to Claim 1, Atsuhiko teaches electrodes 2 formed on a semiconductor chip 1. Spherical metal balls 6 have a given size, which are located on the electrodes 2. An adhesive 7 is bonded to the electrodes 2. Each of the metal balls

6 are formed from a solder used for mounting a semiconductor device on a substrate (see English abstract and figures). Atsuhiko does not teach a metal ball having a radius R selected so that the following equation is satisfied: $.4 \text{ times square root of } A$ is great than or equal R and less than or equal to $2 \text{ times the square root of } A$, wherein A is the surface area of the electrode. However, Fallon teaches a solder ball with a grid pitch of 9 mils and the surface area of each contact pad 50 is 15 square mils (i.e. 3 mils by 5 mils) (see col. 6 lines 34-37). When $R = 9 \text{ mils}$ and $A = 15 \text{ square mils}$, the applicant's equation can be solved using Fallon's above values. It is well known in the semiconductor industry that contacts pads of a PCB can be used as contact pads for a semiconductor chip without departing from scope of the integrated circuit. Therefore, the contact pads taught by Fallon can be substituted for the contact pads taught by Atsuhiko to improve the mechanical and electrical connection of the solder ball to the electrode.

With respect to Claim 2, the low melting metal balls 6 are adhesive bonded to the electrodes 2 with a flux 7 (see English abstract and figures).

With respect to Claim 3, the electrodes 2 are formed from an electrode material of Cu (see col. 3 line 16).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

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invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102((e), f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 4-6, **insofar as some of them can be understood**, are rejected under 35 U.S.C. 103(a) as being unpatentable over Atsuhiko-Fallon as applied to claim 1 above, and further in view of Hisao (JP 59-148352).

Atsuhiko-Fallon does not teach an electrode comprising a layer of an electrode material composed of Al or Al alloy and at least one metal layer of Cu or Cu alloy laminated to the electrode material layer and having a melting point higher than the electrode material. A laminated layer in contact with the electrode material layer of Cu or Cu alloy and at least one layer farthest from the point metal ball formed of Cu.

With respect to Claims 4 and 5, Hisao teaches an electrode 3,4,6 comprising a layer of an electrode material composed of Al or Al alloy layer 3 and at least one metal layer of Cu or Cu alloy layer 4 laminated to the electrode material layer and having a melting point higher than the electrode material.

With respect to Claim 6, a laminated layer 6 in contact with the electrode material layer of Cu or Cu alloy and at least one layer farthest from the point metal ball formed of Cu (see English abstract and figures). Therefore, it would have been obvious to combine the electrode of Hisao with the product of the Atsuhiko-Fallon to improve the workability and reduce the working cost of the semiconductor device.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. It is cited primarily to show the product of the instant invention.

Any inquiry concerning the communication or earlier communications from the examiner should be directed to Alonzo Chambliss whose telephone number is (703) 306-9143. The fax phone number for this Group is (703) 308-7722 or 7724.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-7956.

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